SEL Table of Contents

Section 4 - Information Technology

Overview

This section lists equipment, software, and systems that provide information functionality and interoperability between local responders and other agencies working in cooperation to resolve or manage incidents. The items mentioned serve to develop situational awareness and better coordinate response operations for CBRNE terrorism and homeland security operations.

Like the previous edition, the Spring 2006 SEL has divided information technology, cyber security and communications into three distinct sections (Sections 4, 5, and 6 respectively). While there continues to be a close connection among the three (and even some merging of technologies such as voice communications over the Internet and encryption of data), the separation of sections should make it easier to locate desired items. This edition also continues the practice of providing information on desirable features, operating limitations, and standards (where applicable). These fields are designed to enhance the reader's understanding of the defined items and their practical use.

Online Selection Factors

Like most sections in the 2006 SEL, the online[1] version of the Information Technology Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose User Level and Use Location (described below) as the two factors. Every online item is "tagged" for each appropriate combination of factors. Thus users on the online version can choose any combination of User Level and Use Location, and the system will provide a list of all items tagged for that combination.

The User Levels for information technology equipment are defined as follows:

End User	Users who possess no special training or other qualifications with respect to the equipment being utilized. Examples would be personal computer users who are familiar with basic applications but have not received any classroom or advanced training.
IT Technician	Users who possess some specialized training or other qualifications with respect to the equipment being utilized. Examples would be users who have attended classroom training for a Geographic Information System (GIS), or who have received training in hardware installation and setup.
IT Advanced Technician	Users who possess some extensive training or career-level qualifications with respect to the equipment being utilized. Examples would be trained professional network administrators who possess professional qualifications such as MCSE, or computer repair professionals.

The probable Use Location(s) are defined as follows:

Rear Information Zone - Strategic	Emergency Operations Center/ Joint Operations Center Intel Support.
Rear Information Zone - Operational	Emergency Operations Center/ Departmental Operations Center Intel Support.
Forward Information Zone - Support [Cold]	Incident Command Post Intel Support; near incident scene, but in cold zone.

[1] *The on-line version is available on the Responder Knowledge Base, www.rkb.mipt.org.*

Forward Information Zone - Contamination Reduction [Warm]	Operations/Intel Support in warm zone.
Forward Information Zone - Exclusion [Hot]	Operations/Intel Support in hot zone.

The two factors provide a method for classifying equipment items. For example, a network router might be classified as requiring an IT Advanced Technician to install and configure, and might be used in the Rear Information Zone or the Forward Information Zone - Support [Cold], but would probably not be used in either the Warm or Hot zones. In the online SEL, if a user selected "IT Advanced Technician" and "Forward Information Zone - Support (Cold)" as the two desired selection factor values, the network router item would appear in the search results along with any other equipment recommended for that combination.

Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 01 - Data Acquisition			
04AP-01-DACQ Data Acquisition	Software for data collection and information gathering, including data mining and search tools.		
AP - Application Systems and Software 02 - Alert/Notification Systems			
04AP-02-ALRT Systems, Alert/Notification	Alert and notification equipment that allows for real-time dissemination of information and intelligence. Examples of this equipment include cellular phones, pagers, text messaging, etc.	---------- 'Closed' systems and public alerting systems are available. Consider phone line capacity: notification delivery speed is directly related to items such as # of phone lines, condition of central/other switch, etc.	
AP - Application Systems and Software 03 - Position Locating Systems			
04AP-03-AVLS Systems, Automatic Vehicle Locating (AVL)	Automatic Vehicle Locating (AVL) Systems	Both GPS (differential correction) and DR (ded reckoning) capability. Inclusion of DR preferred. ---------- Procure as package to ensure compatibility. There are several Coordinate Systems and Datum/Projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate Systems may include: Lat/Long, State Plane, UTM, etc. Datum/Projections may include: NAD 27, NAD 83, WGS 84, etc.	

[1] *Use numbers given to refer to Standards List at the end of this document.*

Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 03 - Position Locating Systems - *Continued*			
04AP-03-DGPS Device, Global Positioning System (GPS)	Device, Global Positioning System (GPS)	Differential GPS (DGPS) compatible Wide Area Augmentation System (WAAS) compatible ---------- Required unobstructed line of sight to satellites (not used indoors or underground). There are several Coordinate Systems and Datum/Projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system AND projection. Coordinate Systems may include: Lat/Long, State Plane, UTM, etc. Datum/Projections may include: NAD 27, NAD 83, WGS 84, etc.	
04AP-03-PLTI Systems, Precision Locating Tracking (PLT)	Precision Locating Tracking Systems (PLT), indoor capable	2-D versus 3-D ---------- Emerging technology Range/penetration, ease of set-up	
AP - Application Systems and Software 04 - Geographical Information Systems (GIS)			
04AP-04-GISS System, Geospatial Information (GIS)	Geospatial/Geographical Information Systems (GIS), including application software as well as integrated hardware for implementation. GIS systems support the acquisition, integration and dissemination of geospatial data and imagery. Geospatial software should support vector, raster, CAD, and/or spatial file formats.	GIS systems provide or support multiple CBRNE terrorism prevention and response functions, including (but not limited to): - Geospatial Analysis - allows for association of intelligence and location-based information to perform complex analysis and visualization - Decision Support - provides a mechanism to deliver actionable intelligence supporting strategic and tactical operations - Situational Awareness - supports a common operational picture with near real-time intelligence fused with geospatial information fully describing the area of operations in a spatial context - Navigation - Monitoring (tracking, weather, traffic, assets, environment, damage assessments, disease surveillance) - Modeling - combines complex spatial information and applies modeling tools to pre- →	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 04 - Geographical Information Systems (GIS) - *Continued*			
		dict consequences of events in support of planning, mitigation, response and recovery. - Mapping - presents fused information in a standard, distributable and easily recognizable format. - Reporting (activity, after action, alert-warning, location, situation, coverage portrayal) --- Emerging technology - standards and functionality for GIS software are still being developed. There are several coordinate systems and datum/projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate systems may include: Lat/Long, State Plane, UTM, etc. Datum/projections may include: NAD 27, NAD 83, WGS 84, etc.	
AP - Application Systems and Software 05 - Risk Managment Software			
04AP-05-RISK Software, Risk Management	Software or systems that facilitate capture, quantification, and management of risk factors involved in specific tasks or programs.	Should incorporate some form of data visualization capability. Must provide parameters to allow adjustment of weighting factors for risk components. --- Look for maximum flexibility in defining risk components and weighting that reflect your own requirements in addition to the option of using predefined formulas.	
AP - Application Systems and Software 06 - Data Fusion			
04AP-06-FUSN Software, Data Fusion/Synthesis	Software or system for accepting disparate inputs and producing organized information. May use multiple sensor inputs to develop a situational picture, and/or multiple	May incorporate some form of data visualization and/or pattern detection capability. Should have GIS integration in order to display mapped information. --- If purchased as software, carefully review platform requirements, including ability to handle varying inputs from sensors, outside systems, etc. Check compatibility with related “add-on” software such as pattern recognition, atypical →	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 06 - Data Fusion - *Continued*			
	inputs from different intelligence sources to create a correlated set of accessible data.	signal analysis, and data mining. All three aspects of security (confidentiality, integrity, and availability) are extremely important for these systems. In addition to normal precautions such as strong authentication, firewalls, and fault-tolerant hardware, recurring professional third party vulnerability assessments are recommended for data fusion systems.	
AP - Application Systems and Software 07 - Incident Management			
04AP-07-CDSS Software, ICS	Incident Command System (ICS) software including command/plans & decision-support tools	---------- Emerging technology - standards and functionality are still being developed.	
04AP-07-CRED System, Credentialing	Software application and associated hardware for creating site/event credential badges and controlling scene access.	---------- Additional equipment needs may include: digital cameras, laminating equipment, facial recognition software, etc. Also consider mobile/portable, versus server based/attached systems	89
AP - Application Systems and Software 08 - Analytical Tools			
04AP-08-AFIS Fingerprint Processing and Identification	Equipment for fingerprint processing, including Automated Fingerprint Identification Systems (AFIS) interface equipment.		

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 08 - Analytical Tools - *Continued*			
04AP-08-CBRN Software, CBRNE/ Commercial Chemical/Hazard	CBRNE/commercial chemical/hazard software and response system	---------- Emerging technology - standards and functionality are still being developed.	
04AP-08-FACR Software, Facial Recognition	Facial recognition software for access control, identification of criminal actors (IFF), etc.	---------- Emerging technology - standards and functionality are still being developed.	95
04AP-08-PMOD Software, Plume Modeling	Plume modeling software (fate and transport)/databases capable of real time linkage to sensors and meteorological monitoring and detection.	---------- Emerging technology - standards and functionality are still being developed. There are lot of vendors/researchers offering many differing models of varying quality, many of which are unproven!	
04AP-08-SIGI Software, Investigative, Signals Intelligence	Investigative software for collating and analyzing data from signals intelligence such as pen registers and wiretap management tools.	---------- Tools are guided by various statutes at federal and state levels.	
04AP-08-SVIS Software, Operational Space Visualization	Operational space visualization tools	Mapping Graphical display of data Ability to draw from multiple data sources Data mining →	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 08 - Analytical Tools - *Continued*			
		---------- Emerging technology - standards and functionality are still being developed.	
04AP-08-TRAF Software, Traffic Modeling	Software designed to depict traffic flow, identify congestion points, and predict impact of accidents or deliberate alterations of traffic patterns such as alterations of signal times, detours, closures, etc.	Must be highly parameterized to allow accurate modeling of specific areas. Should be GIS based for interoperability and detail. ---------- Check ease of use, particularly ease of changing key parameters. If your organization already has GIS software, check for compatibility.	
AP - Application Systems and Software 09 - Computer Aided Dispatch			
04AP-09-CADS System, Dispatch, Computer Aided	Computer software system(s) used to track and manage public safety incidents and resources.	---------- Subcomponents optimally should include global positioning, space visualization, automated vehicle location, and alerting systems. See also 04AP-08-SVIS, 04AP-02-ALRT, 04AP-04-GISS, 04AP-03-AVLS.	
AP - Application Systems and Software 10 - Inventory			
04AP-10-INVN Software, Equipment Tracking and Inventory	Application software for tracking of tangible equipment, including location and person(s)/organization(s) responsible.	---------- Consider interoperability (or at least data compatibility) with related systems such as Automated Vehicle Locator Systems (AVLS).	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
AP - Application Systems and Software 11 - Simulation			
04AP-11-SIMS Simulators	Systems that provide interactive audio-visual simulation of operational situations to support training, planning, or decision making.	Generally computer-based. May require additional projection equipment or a dedicated facility. ---------- Need sufficient customization capability to accurately portray mission situations, preferably in the same geographic area. If equipment or weapons are included in the simulation, make sure that they have identical operational characteristics to the real equipment so that participants do not develop habits in the simulator that are detrimental to real world performance.	
HW - Hardware 01 - Computers			
04HW-01-DTOP Computer, Desktop	Desktop computer, basic	">" indicates minimum requirement > Video Graphics Adapter (XVGA) > 16-bit audio > 256MB video memory > 2GHz processor DVD-R / CDRW > 56k modem Network Interface Card (NIC) 10/100 > 80GB hard drive > 4 USB 2.0 ports > 1GB of RAM	
04HW-01-HHCD Computing Device, Handheld	Handheld computing devices with connectivity. Includes a variety of platforms such as PDAs and Windows compatible devices.	Variety of Operating Systems available, including Windows CE, Windows PocketPC, Palm OS, Linux, etc. Wireless interface - 802.11x, Bluetooth, or other ---------- Match mission requirements to OS capabilities and compatibilities. Consider battery life and replacement battery availability. →	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
HW - Hardware 01 - Computers - *Continued*			
		Ruggedization. Sleeves may offer this capability.	
04HW-01-MOBL Computer, Mobile Data	Mobile computer devices, usually mounted permanently in vehicle, operating from DC power supply. Used for data upload and download, as well as local data entry.	Ruggedized (shock, vibration, temperature, humidity, etc.) Ergonomically suited for in-vehicle operation Touch screen - capacitive versus resistive ---------- Connectivity, power supply Consider possibility of using broadband connection for Voice Over Internet Protocol (VOIP) backup communication.	
04HW-01-NTBK Computer, Portable	Notebook or tablet computer, basic	">" indicates minimum requirement > Video Graphics Adapter (XVGA) > 16-bit audio > 64MB video memory > 1.5GHz processor DVD/CD RW > 56k modem Network Interface Connection (NIC) 10/100 > 40GB hard drive (removable) PC MCIA slot > 512MB RAM > 2 USB ports 2.0 ---------- Comparable processor speeds may be lower if Pentium® M chips are used in the machine. Ruggedization.	
04HW-01-SRVR Computer, Server	Computer used as central host to provide connectivity or data to other	Server operating system, often a Unix variant (Solaris, HP-UX, AIX), Linux, Mac OS X Server, Windows 2000 Server, or Windows Server 2003 Look for a minimum of 1GB of memory, 2GB or more preferred. →	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
HW - Hardware 01 - Computers - *Continued*			
	systems.	---------- Consider fault tolerance in design, such as dual power supplies, dual fans, disk arrays (such as RAID 5 arrays) in which "striping" can be used to create redundant storage, error correcting memory, and multiple processor architecture in which processing continues in a degraded mode after failure of single processor. Servers with all of the above features can be extremely expensive. Alternatively, multiple identical servers can be procured and configured as a cluster to provide a desired combination of processing enhancement and redundancy.	
HW - Hardware 02 - Peripherals			
04HW-02-ALL1 All-in-One	Printer / Copier / Fax / Scanner in single device with either inkjet or laser printing capability.	Minimum 600 DPI, high quality would be 1200 DPI USB connectivity desirable Network compatibility desirable ---------- Consumable supplies may be critical, particularly for ink-jet devices. Correct toner cartridges critical for laser devices. Consider types of fax traffic (e.g., images) before deciding on print quality requirement. Consider cost of consumables.	
04HW-02-BARC Equipment, Bar Code Reading and Printing	Bar code readers and printers, including devices that have wireless network capabilities.	Tag and readers ---------- Ensure compatibility of bar code types.	
04HW-02-PLOT Plotter	Output device for producing oversize hard copy output such as maps and	Minimum 600 DPI, high quality would be 1200 DPI B/W or color Large format →	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
HW - Hardware 02 - Peripherals - *Continued*			
	visualization graphics.	USB connectivity desirable Network compatibility desirable --- Consumables (ink supplies) can be critical, and quickly consumed when printing high resolution full-page color. Consider types of output (e.g., images) before deciding on print quality requirement. Consider cost of consumables.	
04HW-02-PRNT Printer	Printer using laser or ink-jet technology.	Minimum 600 DPI, high quality would be 1200 DPI B/W or color USB connectivity desirable Network compatibility desirable --- Consumables (toner and ink supplies) can be critical, and quickly consumed when printing high resolution full-page color. Consider types of output (e.g., images) before deciding on print quality requirement. Consider cost of consumables.	
04HW-02-RFID Devices, Radio Frequency Identification	RF Identification Devices (RFID) and associated readers.	Passive and/or active Tag and readers --- Distance sensitive	
04HW-02-SCAN Scanner	Scanner, flatbed or portable	USB connection capability desirable Network compatibility desirable --- May want RF capability in contaminated zones, perhaps via connection to handheld device.	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
HW - Hardware 02 - Peripherals - *Continued*			
04HW-02-STOR Storage, Portable External	Devices that function as virtual drives for storage and transfer of files. Includes USB memory sticks, flash drives, smart chips, etc.	Minimum 256MB storage Drive emulation Compatibility with digital cameras USB 2.0 compatibility, but still capable of USB 1.1 operation. ---------- Check driver requirements. Some devices may fit cameras but require a reader to interface with PC. Security (device access and content)	
HW - Hardware 03 - Networking Components			
04HW-03-ROUT Router	Network device that connects two or more networks or computers, providing appropriate addressing and packet handling.	Wide variance in size, capacity, and price. May provide Dynamic Host Configuration Protocol (DHCP) service to provide IP addresses on demand to network hosts. May also function as a switch (see 04HW-03-SWCH), or as a Wireless Access Point (WAP - see 04-HW-03-WAP for special issues regarding wireless operation). May have built-in firewall capabilities (see 05NP-00-FWAL for details on firewalls). ---------- Since routers provide a path between networks, proper configuration and security implementation is essential. Low-end routers are often used as an access point for DSL or Cable-Modem connections to the Internet. Highly recommend that routers be able to support 10/100Mbps Ethernet operation. If very high bandwidth is required, routers with 10/100/1000 capability should be considered.	93, 94, 136
04HW-03-SSRV Server, Serial	Device that provides a network (TCP/IP) presence for serial devices. Example: printer network adapter.	---------- Should offer Dynamic Host Configuration Protocol (DHCP) capability as well as the ability to operate at a static IP address.	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
HW - Hardware 03 - Networking Components - *Continued*			
04HW-03-SWCH Switch, Network	Network switching device	Wide variance in size, capacity, and price. --- Smaller switches now used in place of hubs, providing better performance.	
04HW-03-WAP Access Point, Wireless	Wireless Access Point (WAP) for local area networking under 802.11x.	802.11b provided widest compatibility; 802.11g provides improved speed. May be combined with router/switch capability (see 04HW-03-ROUT for details on routers). NOTE: The newest standard, 802.11n, has not yet been finalized, and users should be extremely cautious about purchasing "pre-n" products until the standard has stabilized and its compatibility with earlier standards is established. --- Recommend the following minimum settings (in priority order): 1) Enable strongest available encryption. WPA and WPA2 are preferred, use WEP if they are not available. WEP is more vulnerable to attacks, but still far superior to no encryption at all. 2) Disable Service Set Identifier (SSID) broadcasting. It is not essential, and advertises the existence of the WAP to unauthorized users. 3) Restrict access to the wireless network to specific hosts by MAC address (a special identifier unique to each network access card). 4) Rotate (change) the network encryption key on a regular basis. Recommend monthly.	93, 94, 136
HW - Hardware 04 - Miscellaneous Adapter Cables/Connections			
04HW-04-CABL Adapter Cables/ Connectors	Miscellaneous adapter cables/connectors		

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
MD - Media Devices 01 - Camera and Surveillance Equipment			
04MD-01-CMRA Camera, Still	Still camera, digital or film	Decontaminable/disposable Intrinsically safe housing --- Consider consumables (film cameras) and battery life and memory capacity/medium (digital cameras). Digital images may have legal implications - evidentiary standards for digital imagery are still emerging.	
04MD-01-IRED Camera, Infrared (IR)	Infrared (IR) a. Thermal b. Forward Looking Infrared Radiation (FLIR), and/or c. Infrared detection	Decontaminable/disposable Intrinsically safe housing --- Note calibration requirements and potential cost.	
04MD-01-IRIL Equipment, Illumination, IR	Infrared illumination equipment	Decontaminable/disposable Intrinsically safe housing --- Used as a supplement to IR camera and/or detection equipment.	
04MD-01-LAMP Light Amplification	Light amplification (night vision enhancement) equipment	Decontaminable/disposable Intrinsically safe housing --- Battery availability	
04MD-01-VCAM Camera, Video	Video camera	Intrinsically safe housing Remote operation, including pan, tilt, zoom --- Water-resistant housing accessory desirable for hot-zone operations. →	

[1] *Use numbers given to refer to Standards List at the end of this document.*

Item Number/Title	Description	Features/Operating Considerations	Standards[1]
MD - Media Devices 01 - Camera and Surveillance Equipment - *Continued*			
		Decontamination/disposable potential.	
MD - Media Devices 02 - Projectors			
04MD-02-PROJ Projector, Video	Video projector	XVGA (1024x768) or greater projection capability highly desirable. Remote operation via USB connection desirable. Composite TV signal compatibility desirable. ---------- Check lumen and contrast ratings, particularly if operation will be in areas of high ambient lighting. Check bulb life rating and bulb replacement cost. Operation in high heat environment can impact bulb life.	
MD - Media Devices 03 - Displays			
04MD-03-DISP Display, Video	Video display - assorted technologies including CRT, Plasma, LCD, etc.	---------- Plasma screens are subject to image 'burn-in' and may not be advisable for some applications. Emerging technology - standards and functionality are still being developed.	
SN - Sensor Devices 01 - Remote Sensors			
04SN-01-PTMS Station, Portable Meteorological	Portable meteorological station that monitors (at a minimum) temperature, wind speed, wind direction, precipitation, and barometric pressure.	---------- Considerations: telemetry, greatly affected by placement (micro climates in downtown cores, in buildings, etc.)	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
SN - Sensor Devices 01 - Remote Sensors - *Continued*			
04SN-01-XMIT Transmission Device, Wireless, Remote Sensor	A device which, when attached to a remote sensor such as a video camera or chemical detector, allows wireless transmission of data to a distant base. May use radio frequency (RF), or infrared (IR) transmission.	Compatibility with multiple sensor devices desirable. --- Carefully check effective distance and sensitivity to obstacles and weather. May require line-of-sight. Check effective data rates in marginal conditions, especially if used for live video.	
SW - System and Networking Software 01 - Operating Systems			
04SW-01-OSSS System, Server Operating	Operating systems for servers. Examples include Windows, Mac OS X Server, Unix, Linux.	Minimum version should be: Windows: 2000 or 2003 Apple: Mac OS X Server Linux: Varies by distribution - latest kernel version is 2.6 Unix: Varies with brand - check with vendor for current release --- Check provided browser for 128-bit encryption and SSL capability.	
04SW-01-OSSW System, Workstation Operating	Operating systems for workstations. Examples include Windows, Mac OS X, Unix, Linux.	Minimum versions should be: Windows: 2000 or XP Apple: Mac OS X Linux: Varies by distribution - latest kernel version is 2.6.x Unix: Varies with brand - check with vendor for current release --- Check provided browser for 128-bit encryption and SSL capability.	

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Item Number/Title	Description	Features/Operating Considerations	Standards[1]
SW - System and Networking Software 02 - Application Programs			
04SW-02-EMLC Software, E-mail Client	E-mail client software	May be integrated into office suite. --- See NIST SP 800-45 for security guidance.	133
04SW-02-EMLS Software, E-Mail Server	E-Mail Server Software	--- Need to control relay of outbound mail to prevent server from being used as a spam platform.	133
04SW-02-IMSG Software, Instant Messaging	Instant Messaging (IM) software	Logging capability desirable Enterprise-level systems with encryption are recommended.	
04SW-02-VCSW Software, Video Teleconferencing	Video teleconferencing software	Up to 4 participants. --- Encryption desirable.	
SW - System and Networking Software 03 - Suites			
04SW-03-OFFC Software, Office Software Suite	Office software suite (spreadsheet, database, word processing and graphics presentation)	--- Document interoperability is critical when moving between suites.	

[1] *Use numbers given to refer to Standards List at the end of this document.*

Item Number/Title	Description	Features/Operating Considerations	Standards[1]
SW - System and Networking Software 04 - Network Operating and Monitoring Systems			
04SW-04-NETW Software, Network	Software for networking, monitoring network performance and/or maintaining configuration.	---------- Trained personnel required for installation and operation.	
SW - System and Networking Software 05 - Monitoring Software			
04SW-05-SCAD System, SCADA (Supervisory Control and Data Acquisition)	A software/hardware system designed primarily to monitor and control remote sensors and actuators. Uses vary from large-scale examples such as refinery or power grid control to building HVAC systems.	Remote monitoring and operation of large numbers of devices. Pre-set control functions such as duty cycling of equipment, or automatic device activation or alarms based upon sensor inputs exceeding set limits. ---------- Type(s) of communication between remote points and central controller(s), and susceptibility to interference. Architectural structure may involve only a single controller with direct access to all points, or a hierarchical structure with intermediate controllers able to perform some functions autonomously.	

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